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Utilization of dental services in old age

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Abstract: Regular utilization of dental services helps to improve and maintain oral and general health, even in old age. However, utilization behavior for dental services changes with age: preventive utilization behavior is often replaced by a symptom-driven one. With age, a decrease in the utilization of dental services can be observed, whilst the frequency of contact with physicians increases. The present review describes the current knowledge regarding the utilization of dental services in old age (frequency, reasons for non-utilization, modifying factors). The reasons for non-utilization of dental services are multidimensional: subjective reasons and other objective modifying factors can be distinguished. The frequency of utilization also differs with personal context and attitude. On the basis of the available evidence no conclusive explanation could be provided. A checklist should allow dental practitioners to monitor the factors that affect the utilization of services within their own dental office.

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Utilization of dental services in old age

KEYWORDS

Utilization behavior, gerodontology, senior
 dentistry, oral-health-related healthcare
 research

Figure above: With the walking frame to the dentist –
 frequently just a symptom-driven utilization

SUMMARY

Regular utilization of dental services helps to improve and maintain oral and general health, even in old age. However, utilization behavior for dental services changes with age: preventive utilization behavior is often replaced by a symptom-driven one. With age, a decrease in the utilization of dental services can be observed, whilst the frequency of contact with physicians increases. The present review describes the current knowledge regarding the utilization of dental services in old age (frequency, reasons for non-utilization,

modifying factors). The reasons for non-utilization of dental services are multidimensional: subjective reasons and other objective modifying factors can be distinguished. The frequency of utilization also differs with personal context and attitude. On the basis of the available evidence no conclusive explanation could be provided. A checklist should allow dental practitioners to monitor the factors that affect the utilization of services within their own dental office.

Introduction

The aim of dental care is to maintain or restore the oral health of the population. Along with performing oral hygiene at home, the basis for preserving oral health is regular preventive utilization of dental services by the population. A particularity of the Swiss healthcare system is that citizens are considered personally responsible for maintaining or enhancing their oral health. The generally positive impact of regular dental recalls, such as the preservation or improvement of oral health as well as a reduction in the frequency of acute symptoms and subsequent emergency treatments, is known (SHEIHAM ET AL. 1985, TODD & LADER 1991, MURRAY 1996, MCGRATH & BEDI 2001). Regular dental check-ups significantly reduce both, the prevalence and severity of social and psychological disorders due to oral-health-related problems (RICHARDS & AMEEN 2002). Combined with other factors, such as the reduction in the ability to carry out oral hygiene measures, loss of autonomy, and the decline in the ability to receive treatment (NITSCHKE 2006), as well as other patient-specific factors, a lack of or a reduction in the utilization of dental services can have far-reaching consequences:

The risk of inadequate oral health as well as the resultant increase in emergencies with pain and acute processes in the mouth, jaw and facial area rise considerably as oral-health-related quality of life declines. In addition, a multitude of problems can arise due to insufficient or missing dentures, such as an increased risk of malnutrition. The effects of poor oral health on general health should also not be underestimated. Carrying out adequate oral hygiene in long-term care (LTC) facilities was able to significantly lower the risk of pneumonia and the associated fever and mortality rates (YONEYAMA ET AL. 2002). Oral-health-related problems are also increasingly observed outside dentistry. The costs due to systemic diseases that result from inadequate oral health and the mortality risk are currently hotly debated.

The neglect of oral health along with the increase in frailty and cognitive impairment often leads to procedures that are in some cases complex, drastic, stressful, and associated with considerable logistical, financial, and personnel requirements and additional medical risks. A large number of the oral diseases in old age could possibly be avoided by timely, preventive dental care.

Because of the advances in modern dentistry in the area of dental prevention, diagnostics, treatment, and patient care, older people nowadays often keep their own teeth well into old age. While every third person aged 60 and over had a complete set of dentures in the 1950s in Switzerland, this figure is now about every fifth person (Swiss Health Survey from 1992/1993: 24% of 65- to 74-year-olds, 2002/2003: 22% [ZITZMANN 2004]).

The increase in the percentage of old and very old people in the total population who have their own teeth presents new challenges for dentists despite many treatment options: maintaining utilization of dental services well into old age, despite increasing frailty with restricted mobility, should be the aim of every dentist. The frequency of dental visits as well as the reasons for utilization or non-utilization by older people will be described in more detail in the following. The health status of the older sections of the population leads to largely different living situations, leading us to three different study designs in this review: we differentiate between population-representative studies and studies that only include subjects living at home or in care facilities. The authors of this review have endeavored to allocate the studies to one of these three designs.

However, in some cases it is not described whether those dependent on care have also been adequately considered in the population-representative studies and whether population-specific realities have been adequately considered in studies with subjects living at home. A keyword search in the PubMed literature database was performed (keywords in various combinations, “uptake” or “utilization” or “dental service” with “dental” or “oral health” and “community dwelling” or “institutionalized” or “long-term care” and “elderly” or “aged” or “depend”). The references cited in the articles found in the database were also searched. The literature review was completed in January 2013.

One of the aims of the present study is to describe our current knowledge of the utilization of dental services and its modifying factors. Another aim is to identify how utilization can be positively influenced.

Frequency of utilization of dental services Population-representative studies

According to a survey conducted by the Swiss Dental Association (SSO) in 2000, 73% of Swiss citizens visited their dentist once a year or more often. 65% described their reason for visiting the dentist as a dental check-up visit (KUSTER ET AL. 2000).

On the other hand, the Swiss Health Survey (SHS) showed that the number of annual visits to the dentist by the Swiss population (15- to 74-year-olds; survey periods: 1992/1993, 1997, 2002, and 2007) up until 2007 was lower and falling across all age groups (1992/93: 70.2%; 1997: 64.8%; 2002: 62.1%; 2007: 66%) (SWISS FEDERAL STATISTICAL OFFICE (BFS) 2005, BFS 2010).

Seniors in particular showed a declining utilization of dental services because they often lack time and money because of increasing visits to medical doctors (BFS 2010) (KIVAK & REICHMUTH 2005).

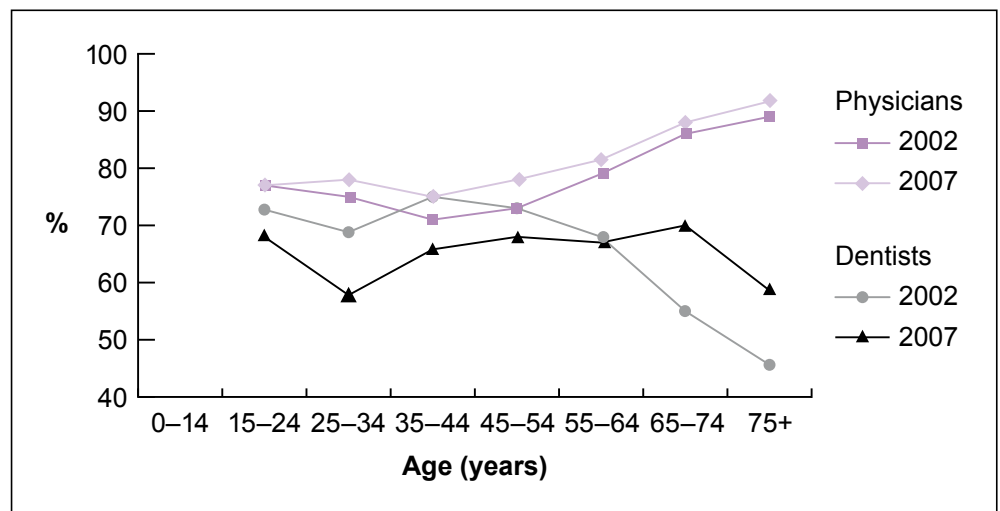
According to the Swiss Federal Statistical Office (BFS), in Switzerland around 67% of the 55- to 63-year-old age group regularly visit a dentist, whereas more than 80% regularly visit a doctor. Of people aged 75 years or over, 40% no longer consulted a dentist at all, while over 90% regularly contacted a medical specialist or primary-care physician (Fig. 1) (BFS 2010).

In the Study of Health in Pomerania (SHIP Study; Germany), it was also shown that in those aged 70 years and over, the mean contact rate with dentists fell with increasing age, while the mean contact rate with doctors increased by more than five times (mean contact rate 70 years and over: dentist: 1.7; doctor: 9.3) (BORN ET AL. 2006).

The Berlin Aging Study (BASE) showed that, among persons aged 70 years and over, 93% regularly contacted their primary-care physician and 60% were also treated by a medical specialist (LINDEN ET AL. 1996). None of the subjects in the BASE study ($n = 512$, 70 to 103 years of age) had visited a dentist in the last 6 months. The time lapse since the last dental visit increased with age: seniors aged 70 to 84 years last consulted their dentist on average 11 months ago (range: 2 weeks to 30 years), while this time lapse increased to 3 years for seniors aged over 85 years (range: 2 weeks to 52 years) (NITSCHKE & HOPFENMÜLLER 1996, NITSCHKE 2006).

The Third German Oral Health Study (DMS III; survey period 1997) indicates that about half of the 65- to 74-year-old subjects, i.e. 54.5% of women and 54.0% of men, showed preventive utilization behavior, i.e. they visited a dentist at regular intervals for prevention (MICHEELIS & REICH 1999).

Fig.1 Swiss consultation rates for physicians and dentists depending on the age of patients in 2002 and 2007 (Swiss Federal Statistical Office 2010).



In the Fourth German Health Survey (DMS IV; survey period 2005), the proportion of subjects aged between 65 and 74 years who visited a dentist annually increased to 72.2% (MICHEELIS & SCHIFFNER 2006).

The National Health Interview Survey (NHIS) in the USA revealed that 53.5% of the over-65 years age group had visited a dentist within the previous year, while the percentage was 67% in the 35- to 54-year-old age group. Over a period of 10 years, more than one quarter of the oldest group (65 years and over) did not at all visit a dentist (WALL & BROWN 2003).

Using data from the Health and Retirement Study (HRS) in the USA, MANSKI ET AL. (2010) determined that with increasing age, there is a reduction in the utilization of dental services (dental consultations within the last 1 to 2 years: 51 to 64 years of age: 70.64%, 65 to 74 years of age: 64.37%; 75 years of age and over: 57.37%).

Studies examining different age groups (young adults, adults, and seniors) showed that there are significant differences in terms of utilization behavior for dental services depending on age (older people: fewer preventive dental visits) (BERGMANN & KAMTSIURIS 1999, BORN ET AL. 2006).

The time since the last dental visit (0 months to 1 year since the last dental visit) proved country-specific for the old and very old (see Tab. I) (MCGRATH ET AL. 1999, WALTER 1997, BERG ET AL. 2000).

Studies on seniors living at home

GALAN ET AL. (1995) studied the oral health status of 170 Canadian seniors (aged 65 years and over) and showed that 46% had visited their dentist in the last 12 months.

IKEBE ET AL. (2002) reported that 60% of the 2,990 subjects in a study in Osaka, Japan, with participants aged over 60 years from a university for seniors, had consulted a dentist within the last year and 33% had attended a recall examination.

21.9% of a Canadian cohort who lived independently at home had visited a dentist within the previous 6 months ($n=1,751$; mean age: 76.2 years, 58.8% women, 72.7% edentulous) (BROTHWELL ET AL. 2008). There was a significantly higher utilization of dental services in the previous 6 months for dentate (36.2%) subjects compared to edentulous persons (13.5%) (BROTHWELL ET AL. 2008).

Stagnation in the utilization of dental preventive services between 1998 and 2006 by seniors aged 65 years and over in the

USA was reported by Skaar and O'Connor (preventive utilization of dental services: 1998: 45.0%; 2006: 46.3%). The group aged 85 years and over as well as the group who visited the dentist for preventive measures (1998: 87.8%; 2006: 91.2%) had the highest increase in dental visits within one year (SKAAR & O'CONNOR 2012) (Tab. I).

Studies on seniors living in institutions

The declining utilization of dental services with increasing age does not correlate with the objective need for dental treatment and care. With declining independence and admission to a care facility, the remaining dentition and prostheses are often in a very poor state. Throughout the stay in LTC facilities, the need for dental care remains high, but, as shown by a number of studies (KATSOUKIS ET AL. 2009, BERG ET AL. 2000), this treatment need is currently only met to a small extent. As early as 1989, Wefers et al. pointed out that following admission to a care facility a reduction in contact with dentists and the number of recall examinations occurred. For 43% of the German study participants, the last dental visit was more than 5 years ago (WEFERS ET AL. 1989).

SHIMAZAKI ET AL. (2004) were able to interview again 719 of an initial 2,220 residents of LTC facilities (65 years of age and over) in Japan after a period of 6 years: with increasing age, the percentage of residents of a care facility who had visited a dentist once or more in the last 6 years decreased (60 to 69 years of age: 67.7%; 70 to 79 years of age: 55.2%; ≥ 80 years of age: 33.2%). At the same time, there was an increase in the non-utilization of dental services (no contact with a dentist in the last 6 years) in these age groups (60 to 69 years of age: 32.3%; 70 to 79 years of age: 44.8%; ≥ 80 years of age: 66.8%).

Utilization of dental services across all investigated age groups can be summarized as follows:

- Preventive utilization of dental services in younger years shifts **increasingly to symptom-driven utilization** in old age. In contrast to general medicine, the declining oral health among seniors does not lead to an increased utilization. Possible reasons may be frailty and multimorbidity.
- Along with the **age-related frequency of dental contacts** (IKEBE ET AL. 2002, WALL & BROWN 2003, SAUNDERS & FRIEDMAN 2007, BROTHWELL ET AL. 2008, MANSKI 2009, ZITZMANN ET AL. 2001), there was also a **country-specificity concerning the time since the last dental visit** (<6 months to less than 1 year

Tab. I Age-dependent utilization of dental services by seniors living at home

Studies of seniors living at home						
Study	GALAN ET AL.	IKEBE ET AL.	WALL & BROWN		SAUNDERS & FRIEDMAN	BROTHWELL ET AL.
Country	Canada	Japan	USA		USA	Canada
Year of publication	1995	2002	2003		2007	2008
Study population [years of age]	≥65	≥60	≥65		≥65	≥65
Dental contacts within the indicated period	[%]	[%]	[%]		[%]	[%]
			1989	1999		
<6 months	–	60.0	–	–	–	21.9
<12 months	46	–	43.2	53.5	42.1	–
1–2 years	–	–	–	–	13.7	–
3–5 years	–	–	–	–	8.9	–
>5 years	–	–	28.0	28.0	35.0	–

since the last dental visit) in the old and very old (see Tab. I) (McGRATH ET AL. 1999, SAUNDERS & FRIEDMAN 2007).

- In contrast to dental visits, with **increasing age there is a considerable increase in consultations with physicians** (GMÜNDER ERSATZKASSE 2006). 95% of the German subjects in a study by Denkinger et al. (1,506 seniors aged 65 to 90 living at home) visited their doctor at least once a year, and 65% of the subjects even visited their doctor twice a year. Factors such as **reduced physical activity, a high BMI, and being male seem to increase the utilization of medical services** (DENKINGER ET AL. 2012). Those persons who could name their primary-care physician had an even higher utilization of medical services (THODE ET AL. 2005). Need also affected contact with physicians: The contact rate increased significantly with increased morbidity, in the event of poor health-related quality of life, and with increasing age. Women revealed a higher utilization of medical services than men (HESSEL ET AL. 2000).
- Dentate subjects showed a higher utilization of dental services than edentates (BROTHWELL ET AL. 2008, NITSCHKE & HOPFENMÜLLER 1996, NITSCHKE 2006).
- The age-related decline in the utilization of dental services contrasts with an objectively increased need for dental treatment and care. People dependent on care have an increased need for dental services (KATSOULIS ET AL. 2009, BERG ET AL. 2000). However, the number of dental contacts falls when a person is admitted to a care facility (WEFERS ET AL. 1989).

Because of the total number of studies available and divided into the three analyzed settings (population-representative studies, studies of seniors living at home, studies of institutionalized seniors), the question on utilization of dental services cannot be conclusively answered. Most studies report that utilization of

dental services declines with increasing age, but it is also dependent on other factors (e.g. dental state, socio-economic context, neighborhood, educational level, treatment need, etc.). Because the studies mentioned above can not be compared due to differences in study design, parameters analyzed, and the study group, the analysis of the available data is difficult. There is, however, a clear message from all of the available studies: the utilization of dental services declines with age. The degree depends on various factors, but in general remains below the utilization of dental services in adults younger than 65 years.

Factors determining the utilization of dental services

The utilization of dental services is influenced by many factors. For a better overview, they were summarized in subcategories and allocated to nine categories –separately for seniors living at home and those who are institutionalized as well as for population-representative surveys (Tab. II).

Population-representative studies

As for the most recent dental service, McGRATH ET AL. (1999) showed in a British study that in 52% of the cases it was motivated by a necessary dental treatment, whereas 36% were attending a recall. Both, McGRATH ET AL. (1999) (Great Britain, emergency treatment as the reason for the most recent dental visit: 10% of those surveyed [aged 60 years and over]) as well as NYSSÖNEN (1992) (Finland, emergency treatment as the reason for the most recent dental visit: 78% of those surveyed [aged 65 years and over]) cited emergency treatments and pain as reason for the last utilization of a dental service.

SLACK-SMITH & HYNDMAN (2004) analyzed the utilization behavior in a gender-specific manner and it became apparent that

Population-representative studies																				
WALTER		NITSCHKE & HOPFENMÜLLER Berlin Aging Study							MCGRATH ET AL.	BERG ET AL.	ZITZMANN ET AL.			MANSKI ET AL.			STADEL- MANN ET AL.			
Germany		Germany							Great Britain	USA	Switzerland			USA			Switzerland			
1997		1996							1999	2000	2001			2010			2012			
65– 74	≥74	70– 74	75– 79	80– 84	85– 89	90– 94	95+	≥60	50–95 (mean: 69.9 ± 8.4 years)	65– 74	65– 74	≥75	51– 64	65– 74	≥75	75– 84	≥85			
[%]		[%]							[%]	[%]	[%]			[%]			[%]			
											1992/ 93	1997	1997							2002
65.8	56.6	46.2	38.6	40.6	24.5	17.5	17.2	38.0	–	–	–	–	–	–	–	–	–			
12.7	13.0	16.7	20.5	20.2	11.7	16.3	9.7	9.0	47.0	56.0	59.0	43.0	–	–	–	47.5	32.6			
10.1	0	7.6	10.8	11.9	14.9	8.8	6.5	14.0	26.5	–	–	–	70.6	64.4	57.4	–	–			
3.8	8.7	15.4	14.4	8.4	13.8	18.8	16.1	6.0	13.1	–	–	–	–	–	–	–	–			
7.6	17.4	14.1	15.7	16.5	30.9	28.8	33.3	34.0	13.4	–	–	–	–	–	–	–	–			

it was affected in both, men and women in Australia by age, education level, smoking, physical activity and social discrimination.

STADELMANN ET AL. (2012) showed that several different subjective reasons motivated the most recent dental visit for seniors in Switzerland. The importance of preventive recall appointments as the reason for contacting a dentist declined with age (age group [AG] 1: 55 to 60 years 35.3%; AG 2: 65 to 74 years 32.2%; AG 3: 75 to 99 years 31.2%). Appointments that were automatically suggested by the dental practice did not increase utilization in elderly patients (AG 1: 33%; AG 2: 31.9%; AG 3: 25.9%). Contacting the dentist was primarily caused by the need for a prosthetic treatment (AG 1: 14.3%; AG 2: 18.4%; AG 3: 23.7%).

Studies on seniors living at home

RISE & HOLST (1982) showed as part of the 1975 Health Survey of pensioners living at home in Norway that factors such as age, gender, school education, or dental status had different effects on the utilization of dental services. One insignificant influence on utilization was age. Gender (men showed a lower utilization of dental services within the last year) only affected dentate persons aged between 65 and 74 years with low levels of education. Both, age and gender also had an indirect effect on utilization via their effect on the dental state of subjects. The most influential variable for the utilization of dental services was dental status, followed by school education of seniors. School education had both a direct and an indirect effect on utilization via its influence on the dental state.

MACENTEE ET AL. (1993) interviewed 521 seniors living independently in Vancouver, Canada, who were aged 70 years and over, and determined that age and gender did neither have an effect per se on oral health nor complaints. The utilization of dental services, on the other hand, was positively

affected by both age (younger seniors) and gender (female subjects). Being male and older deteriorated the utilization behavior. It was also shown that utilization behavior depends on dental state.

IKEBE ET AL. (2002) identified having natural dentition as well as being satisfied with one's personal financial situation as being significantly favorable for the utilization behavior (study population: 2,990 subjects, participants from the university for seniors, aged 60 years and over [mean: 66.5 years], 52% men). In contrast to MACENTEE ET AL. (1993), IKEBE ET AL. (2002) found that being male favored utilization of dental services significantly.

US American subjects, aged 60 years and over, in the National Health and Nutrition Examination Survey had a higher socioeconomic level and a healthier lifestyle if they were cognitively fit. These subjects also showed a higher frequency of utilization of dental services (WU ET AL. 2007).

Older US Americans primarily visited the dentist for treatments that were necessary (prosthetic treatment, adjustment or repair of dentures, professional oral hygiene, recall/monitoring) (SAUNDERS & FRIEDMAN 2007).

Dentate seniors without daily family support and living in urban areas had fewer restrictions in their everyday activities and showed a higher utilization of dental services. Other factors favorably influencing utilization behavior included dental state (natural dentition), financial situation (high income), and other oral findings (current dental problem or long-term use of dentures) (BROTHWELL ET AL. 2008).

OHI ET AL. (2009) examined a total of 1,170 Japanese subjects aged 70 years and over and found that a higher number of remaining teeth and the presence of removable dentures were significant predictors for utilization behavior (dentist contact in the past year). They also showed that regularly attending

Tab. II Factors influencing utilization behavior in relation to dental services

Modifying factors	Population-representative studies																	
	Studies on seniors living at home												Studies on seniors living in institutions					
Sociodemographic factors	IMFELD & LUTZ 1995																	
	NITSCHKE & HOPFENMÜLLER 1996																	
	MCGRATH ET AL. 1999	■		■														
	NITSCHKE ET AL. 2001	■		■	■													
	ZITZMANN ET AL. 2001					■												
	WALL & BROWN 2003	■																
	SLACK-SMITH & HYNDMAN 2004	■	■	■							■							
	KIYAK & REICHMUTH 2005																	
	BORN ET AL. 2006*	■	■	■														
	ALLIN ET AL. 2009																	
Socioeconomic factors	MANSKI ET AL. 2010	■	■	■		■			■	■								
	SLACK-SMITH ET AL. 2010																	
	MANSKI ET AL. 2011																	
	LISTL ET AL. 2012																	
	MANSKI ET AL. 2012																	
	STADELMANN ET AL. 2012	■	■															
	ASTROM ET AL. 2012		■			■			■									
	RISE & HOLST 1982	■	■	■														
	MACENTEE ET AL. 1993	■	■															
	DOLAN ET AL. 1998																	
Health factors	IKBE ET AL. 2002																	
	WU ET AL. 2007																	
	BROTHWELL ET AL. 2008			■	■													
	OHI ET AL. 2009	■		■														
	ARGURY ET AL. 2012			■														
	MORIYA ET AL. 2013																	
	LESTER ET AL. 1998*	■			■													
	SCHIMMEL ET AL. 2008																	
	NITSCHKE ET AL. 2011																	

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preventive dental check-ups was associated with more teeth, being younger, the absence of systemic diseases and symptoms of depression, as well as a higher level of education. On the other hand, subjects with fewer teeth and smokers showed poorer utilization behavior.

Older Australians valued interaction with the dentist as well as increasing their empowerment thanks to obtaining knowledge and information which enables them to take decisions

about their dental therapy independently, responsibly, and autonomously (empowerment is encouraging the ability to act independently/autonomously). Issues such as access to care, costs, and fear also played a major role (SLACK-SMITH ET AL. 2010).

Reduced functional capacity in the subjects (aged 65 years and over) also had a negative effect on utilization behavior with respect to both dental services and services related to oral hygiene (MORIYA ET AL. 2013) (Tab. II).

Tab. III Subjective reasons for the last visit to a dentist

Studies of seniors living at home			
		[%]	Reason for visit
SAUNDERS & FRIEDMAN 2007		28.2	Prosthetic treatment
		25.4	Oral hygiene
		22.8	Recall/check-up
		20.8	Adjustment/repair of dentures
		13.4	Extraction
		9.4	Fillings
STADELMANN ET AL. 2012			
			Necessary extractions (for patients with low level of education, low income, smokers or former smokers, patients with removable dentures) (<i>independent of age</i>)
	55–65 years	35.3	Voluntary recall
		33.0	Invited to recall
		14.3	Prosthetic treatment
	65–74 years	32.2	Voluntary recall
		31.9	Invited to recall
		18.4	Prosthetic treatment
	75–99 years	31.2	Voluntary recall
		25.9	Invited to recall
		23.7	Prosthetic treatment
Population-representative studies			
		[%]	Reason for visit
NYSSÖNEN 1992			
			Emergency/pain (no data)
MCGRATH ET AL. 1999		10.0	Emergency
		36.0	Recall
		52.0	Treatment
		1.0	No data
MICHEELIS & REICH Collected 1997, published 1999	65–74 years	54.3	Preventive dental visit
		40.9	Symptom-driven dental visit
		4.8	No data
MICHEELIS & SCHIFFNER Collected 2005, published 2006	65–74 years	72.2	Preventive dental visit
		27.4	Symptom-driven dental visit
		0.4	No data

Studies on seniors living in institutions

Frail adults and seniors living in LTC facilities face larger barriers in terms of access to dental services and present more often with a reduced dentition, periodontal diseases or edentulism (DOLAN & ATCHINSON 1993).

Seniors in LTC facilities have worse oral health and a significantly greater need for treatment (BERG ET AL. 2000). Seniors in LTC facilities who were older than 80 years, had inadequate or poor physical and/or mental health and who suffered from systemic diseases made considerably less use of dental services. Dental factors such as edentulism, inadequate prosthetic treatment and the absence of a dental treatment need also had a negative effect on contact with a dentist (SHIMAZAKI ET AL. 2004) (see Tab. II).

Subjective reasons cited by seniors for non-utilization

The reasons cited by the seniors themselves for their most recent visit to of a dentist vary widely (Tab. III).

The primary reasons for non-utilization of dental services (NUDS) are to be considered separately (Tab. IV).

Studies on seniors living at home

In Great Britain in 1980, SMITH & SHEIHAM identified a discrepancy between the real (objective) need for dental treatment and the (subjective) perception by the older adults themselves of their need for treatment. Thus, less than half (42%) of the older subjects participating in the study, all of whom had a real need for treatment, felt that they needed dental treatment. As little as 19% of them had even attempted to obtain this treatment (SMITH & SHEIHAM 1980).

Among 437 seniors aged 75 years and over living independently in England, MACENTEE ET AL. (1988) show that the primary reason for NUDS is the subjective feeling that everything is all right. Costs or difficulties with transport were also cited as barriers to accessing dental treatment. Fear as a factor (3%) was responsible for a small percentage of non-utilization (MACENTEE ET AL. 1988).

In 1991, SCHOU & EADIE reported that, for seniors aged 65 years and over, tooth loss was considered an expected and accepted part of aging. Seniors in Scotland also preferred dental visits aimed at treating symptoms. Again some of the reasons for NUDS included the absence of a perceived need for treatment as well as a low level of interest in personal oral health. The subjects did not associate general health with oral health. However, reasons such as fear of the dentist and high cost equally had a negative effect on utilization behavior (SCHOU & EADIE 1991).

GALAN ET AL. (1995) cited the lack of a subjectively perceived need for treatment as a reason for non-utilization (88% of the 170 surveyed, > 65 years, mean age 82 years).

As part of the GiA-aiM study (Health in Old Age – Including Oral Health), it was shown that the primary reason for not visiting the dentist for 72% of seniors living at home and those cared for by outpatient nursing services was a lack of a subjective need for treatment. They also cited their edentulism or the wearing of dentures as reasons. However, factors such as fear (6.0%), cost of the treatment (8.0%) and frailty (6.0%) also played a role (NITSCHKE ET AL. 2010).

Studies on seniors living in institutions

Studies on seniors living in institutions revealed that only around a quarter of the seniors in LTC facilities in Scotland,

who were offered either dental care on-site in their facility or organized transport to the dentist, made in fact use of dental services (HALLY ET AL. 2003). Seniors who did not give any great importance to their oral health prior to admission to a care facility, did not do so after admission either (SHAY 1990). Two thirds of all dental treatments in inpatient care facilities are aimed at treating symptoms or take place on request (ETTINGER

Tab. IV Subjective reasons that influence utilization behavior with respect to dental services

Symptom-driven dental visit	SCHOU & EADIE 1991 MATTIN & SMITH 1991
No reason for treatment	SCHOU & EADIE 1991 DOLAN & ATCHINSON 1993 LESTER ET AL. 1998 MACENTEE ET AL. 1988
No interest in oral health	SCHOU & EADIE 1991
Fear	SCHOU & EADIE 1991 BORREANI ET AL. 2010 DOLAN & ATCHINSON 1993 SMITH & SHEIHAM 1980 MACENTEE ET AL. 1988
Costs	SCHOU & EADIE 1991 BORREANI ET AL. 2010 DOLAN & ATCHINSON 1993 LESTER ET AL. 1998 STRAYER 1995 SMITH & SHEIHAM 1980 MACENTEE ET AL. 1988
Lack of association between oral and general health	SCHOU & EADIE 1991
Self-treatment is preferred to professional treatment	SCHOU & EADIE 1991
Lack of knowledge and information	SLACK-SMITH ET AL. 2010
Access to care	SLACK-SMITH ET AL. 2010 BORREANI ET AL. 2010
Transport difficulties	DOLAN & ATCHINSON 1993 LESTER ET AL. 1998 STRAYER 1995* MACENTEE ET AL. 1988
Immobility	SMITH & SHEIHAM 1980
Own dentist not available	ARCURY ET AL. 2012
Does not want to "burden" the dentist	SMITH & SHEIHAM 1980
Clinic not accessible	SMITH & SHEIHAM 1980
Edentulism/possession of a complete denture	MCGRATH ET AL. 1999
Tooth number	MCGRATH ET AL. 1999
Only treatment at home wanted	LESTER ET AL. 1998
Difficulty for third parties to organize appointments	LESTER ET AL. 1998
Poor general health	STRAYER 1995
* Study population both in care facilities and with home-based care	

1993, DE BAAT ET AL. 1993), which is not surprising because the number of seniors in LTC facilities who only visit the dentist because of symptoms is large (93% of those aged over 60 years) (LESTER ET AL. 1998). Along with the lack of a subjective need for treatment (86%), reasons cited accounting for this also included high cost and transport difficulties (LESTER ET AL. 1998). The desire that the dental treatment should be carried out at home (52–75%, rising with increasing age [60 to over 90 years of age]) was also mentioned as a reason for non-utilization of dental services. The nursing staff surveyed also found it difficult to make dental appointments for the seniors (93%) (LESTER ET AL. 1998).

Studies also cited the higher priority of treating general physical conditions and systemic diseases as a reason for the often poor oral health (WEFERS 1989, STARK 1992). Factors such as immobility, dementia (BENZ & HAFFNER 2008) or mental disorders also render visiting the dentist very strenuous, which in turn has a negative effect on utilization (CLAUS 1982).

The lack of a subjective need for treatment (86.5%), wearing dentures (9.8%), and frailty were the primary subjective reasons according to NITSCHKE ET AL. (2010) for non-utilization of dentists by the seniors living in a care facility (NITSCHKE ET AL. 2010).

In summary, it can be stated that frail seniors visit the dentist less and less often and mainly with the aim of dealing with symptoms. The reasons that cause old and very old people to not visiting the dentist regularly can certainly not be conclusively explained. Nevertheless, it seems apparent that patient-specific factors (frailty, immobility, mental and/or cognitive impairment) in seniors living in LTC facilities have a greater impact than in seniors living at home (Tab. IV).

Senior-adequate management for better patient adhesion

To maintain or reactivate the utilization of dental services by seniors, the following parameters may be modified (see also the checklist).

1. Infrastructure

Access to the dental practice

The dental practice should be easily accessible to frail seniors or those dependent on care as well as those who can be transported. This includes the availability of public transport or the presence of parking spaces nearby. Barrier-free access to the premises should also apply to seniors with limited mobility and who are at risk of falling. This includes the design of both, the public access and the premises themselves. Inside, signposting must be clear and the illumination must be adequate. Sufficient handrails, on both the left and right side, should be installed.

2. Practice design

Senior-appropriate features

Increasing a patient's well-being when visiting a dental practice (BÄR ET AL. 2009) can have a critical influence on utilization and adherence (previously referred to as compliance) of the patient. The dentist and the team should welcome older patients with their heterogeneous demands. Empathy and how patients are treated, the availability of aids (Fig. 4 and 5), and the overall accessibility of the premises all affect the well-being of the patient. In a senior-oriented practice, all seniors, regardless of whether they are fit, frail, or dependent on care, have the opportunity to participate in quality-oriented dental care. Both the office design and its equipment should meet the require-

ments and needs of the heterogeneous patient group of seniors. This begins with the practice signboard and signposting for directions, which should be designed also for patients with reduced vision. The design of the reception area and waiting rooms (Fig. 2) as well as the toilet facilities, the way to the treatment room (Fig. 3), and the treatment room itself should all be adapted to the special needs of elderly and immobile patients. The use of aids (ready-made reading glasses and hearing aids, dental shields [devices to hold the mouth open in case of func-



Fig. 2 Chairs with straight armrests are preferable to those without armrests because they enable seniors with limited functional capacity to sit down and stand up more easily. A senior-appropriate waiting room design increases the well-being in the dental office.



Fig. 3 Sufficient space for walking frames or wheelchairs in the waiting area, on the way to the treatment room as well as in the treatment room itself.

Checklist

Strategies to ensure utilization of dental services



1

Infrastructure

Constantly check access to the clinic

- Public transport ☐
- Signed parking spaces near the clinic ☐
- Readily visible signposts to the dental practice ☐
- Barrier-free access to the practice ☐
- outside area (e.g. correctly paved walkways) ☐
- on the premises (e.g. adequate lighting for stairs) ☐

2

Practice design

Senior-appropriate features

- Reception and waiting area ☐
- Way to the treatment room ☐
- Furnishings/equipment in the treatment room ☐
- Aids (e.g. ready-made reading glasses, hearing aids, dental shields, cushions, etc.) ☐
- Mobile dental equipment ☐

3

Clinic management and team

Increase the gerodontological “well-being factor” of the practice

- Structured templates for information, clarification, and explanation ☐
- Appropriate scheduling of appointments (requests of the patient and accompanying persons) ☐
- Evaluation of follow-up care competence ☐
- Evaluation of autonomy ☐
- Reliable recall management ☐
- Regular surveying of practice statistics regarding seniors ☐
- Monitoring of recalls for seniors ☐
- Follow-up for declined/missed appointments ☐
- Consistent referral network ☐
- Friendly team, trained in dealing with seniors ☐
- Organization of transport to the dental practice ☐
- Mobile treatment paths ☐
- Provision of mobile dental care ☐

4

Treatment management

- Postgraduate training and continuing education for dentists ☐
- Consideration of dental functional capacity ☐
- Therapy adapted to function and prevention concepts ☐
- Care responsibility ☐
- Diagnosis how uptake and care are assured ☐
- Contact with physicians (primary-care physician concept), networking ☐



Fig. 4 The use of aids, in this case a dental shield

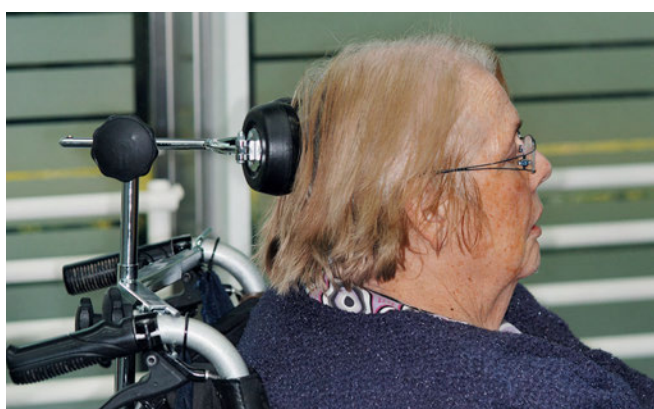


Fig. 5 The use of aids, in this case a head rest that can be attached to a wheelchair, can make the treatment easier for both, immobile patients and the dentist.

tional impairments and to keep the cheeks or lips out of the way] [Fig. 4], cushions for improved positioning, etc. [Fig. 5] can be beneficial for both, patients and the dentist.

3. Clinic management and team

Structured contact level

Dental treatment and care for elderly patients are also associated with increased administrative work (e.g. appointments must be made in writing because this is often not possible by telephone or telephone contact is unreliable, administrative and medical information must be obtained from third parties [medical reports, contact with patient representatives/relatives, etc.], clarification and explanation or the consent of third parties regarding the planned treatment, etc.). Structured correspondence (e.g. using standard letters, templates for information leaflets and informed consent forms) can help to simplify these procedures and improve efficiency. The medical history form must be constantly updated. At the same time, this helps the dentist to protect himself or herself, particularly when patients have advisors or legal representatives.

Availability for treatment appointments/times

For both elderly patients living at home and those living in institutions, general medical and logistic needs should be considered when making appointments (diabetes mellitus, timing of medication intake, increased time requirements in the morning, meals on wheels, home-based nursing services). Appointments should be sensitive to these needs, and elders must not

be used to fill gaps in the appointment book. Nursing services, transport by family members, and the logistic and administrative aspects of the care facilities should also be taken into consideration.

Seamless referral network

Continuous dental care can only be guaranteed if a change in dentist can be ensured for situations such as moving house, for example. The dental staff should offer to send any documents to the future dentist. Should older patients who regularly attend their appointments not show up, the dental staff should repeatedly contact them and offer new appointments in order to not lose the patient from the recall system.

Qualified management of seniors by the team

Along with patient management appropriate for seniors (e.g. with communication = frequent contact with detailed discussions), the dental team should also be prepared for the increased administrative effort required (several contact persons = patient, legal representative, family).

A great deal of patience and knowledge is required of the dental team, and it would be worthwhile for every team member to attend further training courses in the area of "seniors in the dental office." Team meetings should include discussions about routine issues.

In the area of prevention, the use of specially trained hygienists can better meet the needs of frail adults. This area is particularly important because the ability of patients to maintain oral health can decline because of impaired manual dexterity, reduced hand force, and deteriorating vision. To compensate for reduced oral hygiene at home, professional tooth and denture hygiene services should additionally be provided at close intervals. Thus, regular checks on the oral health of older patients can be ensured and any changes in dental functional capacity can be detected at an early stage. The patient becomes familiar with the practice and the dental team, which in turn may increase adherence and facilitate any dental treatment that may become necessary.

Mobile equipment

In terms of equal opportunities with regard to access to dental services, it should be taken into consideration that patients living in institutions are often limited to visit dental practices due to their poor general health or reduced mobility. Mobile equipment for prevention of emergencies and oral health screening can improve the patient adhesion and help providing the urgently needed dental services.

Thanks to mobile equipment dentists can take the initiative and treat patients on-site in the care facility. Such models for on-site dental services are well known, for example the *mobileDent™*, a Swiss concept for providing care for elderly and very old people in LTC facilities in the canton of Zurich, and *Teamwork*, a concept in Munich for providing nearby treatment. Any dentist can offer mobile dental services as part of his or her clinical practice. These mobile services are often resulting from an enormous personal commitment, as the additional costs cannot always be covered.

4. Treatment management

Education – training – specialization of dentist and dental team

The basis for successful management of patient binding is the education and training in the domain of dental care for the

elderly, both of the dentist and his or her team (NITSCHKE ET AL. 2012). Today, dental students should be well trained for the heterogeneous group of seniors both in theory and practice (KOS- SIONI ET AL. 2009). In Switzerland, issues relating to aging and the treatment of seniors are already a compulsory part of the undergraduate curriculum. Dentists should also participate in continuing education in the area of gerodontology to obtain specific expertise in the management of elder, usually multi-morbid patients as well as their dental care. Postgraduate curricula for dentists, as offered by the German Society for Gerodontology (www.dgaz.org), as well as continuing education for the dental team help ensuring that the needs of older people are covered in routine clinical practice.

Diagnosis how care and uptake are assured

As part of a care diagnosis, dentists should clarify the responsibilities to ensure that dental services are utilized by older patients. A care diagnosis includes the compilation and evaluation of information and knowledge for patient-specific or individual dental and medical care for a patient. If the oral-health-related personal responsibility of a patient is impaired, this should be compensated for by his or her environment. Courses for specialist medical and nursing personnel only include limited consideration of the complex issues surrounding oral health for those dependent on care. Consequently, adequate care guidelines and implementation strategies are missing in practical implementation. A reduced ability to maintain oral health often cannot be compensated for, and comprehensive dental care is not adequately structured. Therefore the care team should be individually instructed on the basis of the care diagnosis to ensure that daily oral and denture hygiene is maintained at home. It should be one of the tasks of the dentist and his or her specialized team to promptly identify limitations in the care environment and to immediately initiate the guidance, instruction, and training of those in the patient's medical and nursing environment in terms of oral-health-related problems and their management. In this regard, care models in Germany have made a name for themselves (e.g. Teamwerk, Munich), primarily achieving preventive successes using a dual concept. In Switzerland there are cooperative arrangements between universities to provide interdisciplinary education for prospective dentists and doctors of medicine that is offered at foundation level and in further education and is intended to stimulate mutual understanding of the problems involved (University of Zurich: student elective "The elderly human" for doctors of medicine and dentists completing basic studies; interdisciplinary case colloquium for dentists, geriatricians, gerontopsychiatrists, and those in private practice). Representatives from professional associations should provide assurance that the dentist will be rewarded for his or her additional work. For this purpose, additional benefit items in reimbursement schedules must be created to which persons dependent on care should have a legally defined claim.

Screening methods

In addition to the general medical and dental history of the patient, some experts propose that the dental practice team routinely perform geriatric assessments (e.g. Activities of Daily Living [ADL], Body Mass Index [BMI], Mini Nutritional Screening [MNA], Mini Mental State [MMS]). On the one hand, this enables a better assessment of the patient's dental functional capacity. On the other, it also ensures that interdisciplinary

assessments by a specialist consultant can be initiated without further delay (e.g. in the case of suspected malnutrition or similar). Better knowledge on the patient's ability to cope with the activities of daily living helps to better understand problems with utilization.

Ability for maintenance

Dental care adjusted to the dental functional capacity of the senior, including prospective planning, should be practiced, whereby the patient's ability for maintenance should also be determined. The term ability for maintenance includes all factors necessary to ensure the long-term success of dental treatment and care (e.g.: Is the patient able to carry out his or her oral hygiene independently? Are there diseases present that could have a negative effect on oral and denture hygiene or the utilization of dental services? Is a progression/deterioration of this disease expected? In case of doubt, are there support persons, who could be contacted before treatment, who would have a positive effect on oral and denture hygiene as well as utilization behavior and/or who could help maintaining them?).

Successful utilization of recall is based on considering right at the beginning of treatment planning how maintenance can be assured, e.g. how a prosthetic restoration can also be maintained in the event of the deterioration of the general medical condition of the patient. Treatment planning also comprises ensuring that the restoration can be adapted with minimal effort to a new context. Furthermore, treatment planning should take into account who will be responsible for maintaining oral and denture hygiene and for ensuring the utilization of recall.

Interaction with supporting persons, relatives, nursing staff, benefactors, primary-care physician, anesthetist, and patient representatives

Dentists should take care to build a network with other partners from the patients' interdisciplinary team. This enables not only verification of diagnostic information provided by patients, but also forging links for mutual coordination, which is also helpful for a successful treatment. For patients who can no longer take their own decisions independently, the decision maker can better contribute to decisions about therapy through empowerment.

Older patients have increasing contact with primary-care physicians. This interface should be used to motivate patients to take advantage of regular preventive dental examinations. In the dental primary-care concept of Nitschke and Reiber (NITSCHKE & REIBER 2009), a screening tool is available that helps primary-care physicians to determine a dental treatment need. If trigger points appear during completion of the short questionnaire, the primary-care physician should ask the patient to contact his or her dentist. The dentist contacted in turn informs the physician about the oral health findings of their joint patient by filling in a short form. The patient is motivated to keep the dental appointment because it is based on a recommendation from his physician.

Summary and conclusion

To address issues related to reduced utilization of dental services by older people, the "feeling-well factor" of the dental practice should be checked and if necessary increased. Barriers should be eliminated, the uptake of dental services should be encouraged, and the old and very old patients should not face unmanageable situations. Dental functional capacity must be

taken into consideration and repeatedly reevaluated during treatment.

Ongoing adjustment of the treatment concept to address changes in patient's dental functional capacity as well as intensifying and developing interdisciplinary cooperation, continuing education for caretakers in the patient's environment, dental office design, and providing consistent recall can take into account individually variable utilization behavior in old age. A senior-oriented dental practice should have a structured clinical concept in which utilization of dental services is considered. Incremental treatment concepts are beneficial also from the dentist's perspective with regard to potential problems which may arise when utilization decreases. Coping and adaptation strategies of the patient, his or her environment, and the dental team have priority, whereby positive experiences (achieving minor treatment goals, providing practical assistance, adjusting dental tools, providing various seating possibilities) with the supportive attitude of the dental team and the patient's environment being essential. In this way, oral health can be promoted until old age, and the burden associated with

dental emergencies for patients (pain, stress), their environment (logistics to arrange for transport and accompanying persons), and the dental team (administrative effort and time) can be reduced. Facilitating utilization can help those in the patient's environment, particularly nursing personnel, to value the oral health of patients dependent on care and to facilitate utilization behavior. Using dental services generally leads to an improvement in general medical health and the oral-health-related quality of life. Older people living in institutions in particular have high needs for dental care, treatment, and recall but reduced utilization behavior. However, the number of studies that deal with the reasons behind and factors influencing the utilization or non-utilization of dental services by seniors dependent on care in both inpatient and outpatient settings is very small. The professional associations in the different countries are invited to support continuing education for dental professionals in the domain of dental care for the old and very old and to create conditions which ensure that the additional resources and effort required associated with the treatment are adequately compensated.

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